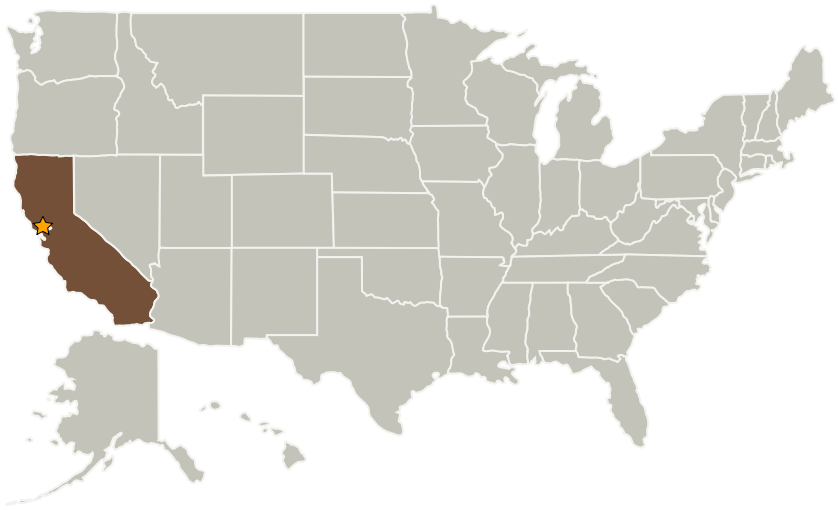
High Performance Fiber-Optic Sensor for Environmental Monitoring, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

Los Gatos Research (LGR) proposes to develop a low-cost, compact, lightweight, rugged and easy-to-use environmental monitoring optical fiber sensor device based on the principle of cavity-enhanced absorption technique. This novel instrument will record concentration measurements of multiple gases including CO and CO2 with ultrahigh sensitivity, stability, and accuracy in real time with low power consumption and without external calibration. By increasing the measurement sensitivity of CO and CO2, the proposed device will allow reliable, gravity-independent monitoring of ecological stability in environments at arbitrary gravity range. In Phase I, LGR will develop and test the prototype fiber-optic-based ICOS device and algorithm that can simultaneously measure CO and CO2 with state of the art accuracy, specificity, repeatability, and sensitivity. The compact sensor device will measure both CO and CO2 concentrations in air with an uncertainty of less than 1 part in 1000 in less than 30 seconds, and require no calibration or reference gas. In Phase II LGR will construct a field deployable device optimized for this application. We will demonstrate the unit's inherent stability, ruggedness and performance in the field at a facility to be specified.

Primary U.S. Work Locations and Key Partners



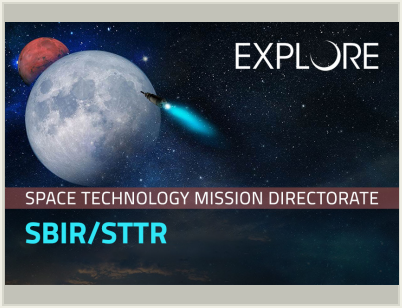


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Table of Contents

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Los Gatos Research	Supporting Organization	Industry	Mountain View, California

Primary U.S. Work Locations
California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

An-dien L Nguyen

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.4 Environmental Monitoring, Safety, and Emergency Response
    - TX06.4.1 Sensors: Air, Water, Microbial, and Acoustic